

FCC Test Report

EQUIPMENT : iPAQ Voice messenger
BRAND NAME : HP
MODEL NO. : HSTNH-F20C
FCC ID : B94HHF20C
STANDARD : 47 CFR FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Spread Spectrum (DSS)
APPLICANT : Hewlett-Packard Company
10955 Tantau Ave., CupertinoCA, 95014-0770, USA

The product sample received on May 22, 2008 and completely tested on Jul. 21, 2008. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.



Reviewed by: Daniel Lee
/ Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



TABLE OF CONTENTS

SUMMARY OF TEST RESULT 3

1 GENERAL DESCRIPTION 5

1.1 Applicant 5

1.2 Manufacturer 5

1.3 Basic Description of Accessories 5

1.4 Feature of Equipment under Test 6

1.5 Applied Standards 7

1.6 Ancillary Equipment List 7

1.7 Testing Facility 7

2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST 8

2.1 Carrier Frequency Channel 8

2.2 Pre-Scanned RF Power 8

2.3 Test Mode 9

2.4 Connection Diagram of Test System 10

2.5 RF Utility 10

3 TEST RESULT 11

3.1 Number of Channel Measurement 11

3.2 20dB Bandwidth Measurement 13

3.3 Hopping Channel Separation Measurement 16

3.4 Dwell Time of Each Channel Measurement 19

3.5 Peak Output Power Measurement 21

3.6 Band Edges Measurement 22

3.7 AC Conducted Emission Measurement 25

3.8 Radiated Emission Measurement 31

3.9 Antenna Requirements 41

4 LIST OF MEASURING EQUIPMENTS 42

5 UNCERTAINTY OF EVALUATION 43

6 CERTIFICATION OF TAF ACCREDITATION 45

APPENDIX A. PHOTOGRAPHS OF EUT 46



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
	RSS-210				
4.1	15.247(b)(1)	Number of Channels	≥ 15Chs	Pass	
	A8.4(2)				
4.2	15.247(a)(1)	20dB Bandwidth	NA	Pass	-
	A8.1(a)				
4.3	15.247(a)(1)	Channel Separation	≥ 2/3 of 20dB BW	Pass	-
	A8.1(b)				
4.4	15.247(a)(1)(iii)	Dwell Time of Each Channel	< 0.4sec in 31.6sec period	Pass	-
	A8.1(d)				
4.5	15.247(a)(1)	Peak Output Power	< 0.125W	Pass	-
	A8.1(b)				
4.6	15.247(d)	Frequency Band Edges	< 20dBc	Pass	-
	A8.5				
4.7	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit -10.86 dB at 0.4019 MHz
	Gen 7.2.2				
4.8	15.247(d)	Transmitter Radiated Emission	15.209(a) 15.247(d)	Pass	Under limit -3.79 dB at 2483.50 MHz
	A8.5				
4.9	15.203	Antenna Requirement	N/A	Pass	-
	15.247(b)(4)				
	A8.4(2)/(6)				

1 General Description

1.1 Applicant

Hewlett-Packard Company
10955 Tantau Ave., CupertinoCA, 95014-0770, USA

1.2 Manufacturer

FOXCONN Technology Group
4F G5 No.2,2nd Donghuan Road, 10th Yousong Industrial District, Longhua, Baoan, Shenzhen City, Guangdong Province, China 518109

1.3 Basic Description of Accessories

AC Adapter 1	Brand Name	HP
	Model Name	PSAA05-050
	Power Rating	I/P:100-240Vac, 50-60Hz, 200mA; O/P: 5Vdc, 1A
	AC Power Cord Type	1.8 meter shielded cable without ferrite core
AC Adapter 2	Brand Name	HP
	Model Name	PSB05R-050Q
	Power Rating	I/P:100-240Vac, 50-60Hz, 200mA; O/P: 5Vdc, 1A
Battery 1	Brand Name	HP
	Model Name	HSTNH-T20B-S
	Power Rating	3.7Vdc, 1200mAh
	Type	Li-ion
Battery 2	Brand Name	HP
	Model Name	HSTNH-K20B-H
	Power Rating	3.7Vdc, 1940mAh
	Type	Li-ion
Earphone	Brand Name	FOSTER
	Model Name	480052
	Signal Line Type	1.45 meter non-shielded cable without ferrite core
USB Cable	Brand Name	Foxconn
	Model Name	CUNC005B-T45-EF
	Signal Line Type	1.4 meter shielded cable without ferrite core
LCD Panel	Brand Name	SAMSUNG
	Model Name	LMS241GF17
Camera	Brand Name	SAMSUNG
	Model Name	MOMBE547G6A

Remark: Above EUT's information was declared by manufacturer. Please refer to the specifications of manufacturer or User's Manual for more detailed features description.

1.4 Feature of Equipment under Test

PRODUCT FEATURE & SPECIFICATION	
Equipment	iPAQ Voice messenger
Brand Name	HP
Model No.	HSTNH-F20C
Frequency Range	2400 - 2483.5 MHz
Number of Channels	79
Channel Spacing	1 MHz
Output Power to Antenna	GFSK: 2.70 dBm ; EDR: 0.11 dBm
Antenna Type	PIFA antenna with gain 2 dBi
Antenna Connector Type	NA
Power Supply	DV 3.7V / AC 100~240V
Type of Modulation	GFSK(1Mbps) / $\pi/4$ -DQPSK(EDR 2Mbps) / 8-DPSK (EDR 3Mbps)
DUT Stage	Identical Prototype

Remark:

- The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
- This test report recorded only product characteristics and test results of Digital Spread Spectrum (DSS).
- For accessories equipped with this EUT, please refer to the appendix of the external photo.
- For other wireless features of this EUT, test report will be issued separately.
- The differences between two adapters and batteries provided to the testing:

AC Adapter 1	Brand Name	HP
	Model Name	PSAA05-050
	Power Rating	I/P:100-240Vac, 50-60Hz, 200mA; O/P: 5Vdc, 1A
	AC Power Cord Type	1.8 meter shielded cable without ferrite core
AC Adapter 2	Brand Name	HP
	Model Name	PSB05R-050Q
	Power Rating	I/P:100-240Vac, 50-60Hz, 200mA; O/P: 5Vdc, 1A
Battery 1	Brand Name	HP
	Model Name	HSTNH-T20B-S
	Power Rating	3.7Vdc, 1200mAh
	Type	Li-ion
Battery 2	Brand Name	HP
	Model Name	HSTNH-K20B-H
	Power Rating	3.7Vdc, 1940mAh
	Type	Li-ion

1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR FCC Part 15 Subpart C §15.247
- FCC Public Notice DA 00-705
- ANSI C63.4-2003

Remark:

- All test items were verified and recorded according to the standards and without any deviation during the test.
- This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC) which recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable / Power Cord
1	BT Base Station	Anritus	8852A	N/A	Unshielded, 1.8 m
2	Bluetooth Earphone	Engotech	ET-BH111	PQY471087	N/A

1.7 Testing Facility

Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C TEL: +886-3-3273456 / FAX: +886-3-3284978		
	Sporton Site No.		IC Registration No.
Test Site No.	CO04-HY	03CH06-HY	4086B-1

2 Test Configuration of Equipment under Test

2.1 Carrier Frequency Channel

Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	40	2442
01	2403	:	:
02	2404	76	2478
:	:	77	2479
38	2440	78	2480
39	2441		

2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and recorded the RF power output in the following table:

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	/4-DQPSK	8-DPSK
		1Mbps	2Mbps	3Mbps
00	2402	2.70	-0.04	0.11
39	2441	2.07	-0.95	-0.50
78	2480	1.82	-1.38	-1.03

Remark:

- The data rate, 1Mbps, was chosen to be tested, due to the highest RF output power.
- Bluetooth uses frequency hopping spread spectrum (FHSS) operation which also facilitates Bluetooth multiple access and coexistence among other types of wireless systems. The basic frequency-hopping pattern is a pseudo-random ordering of 79 channel frequencies in the ISM band and the hopping rate is nominally 1600 hops per second. The EDR modulation format uses one of two types of DPSK (Pi/4-DQPSK or 8-DPSK) in the payload section of the packet. As shown in figure, the EDR packet begins using GFSK modulation during the access code and header portions of the packet but changes to DPSK modulation after the guard time. Changing to a DPSK format allows increased data rates of 2 Mb/s or 3 Mb/s.
- The EUT is programmed to transmit signal continuously for all testing.

2.3 Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction (150 kHz to 30 MHz), radiation (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). Pre-scanned tests were conducted to determine the final configuration from all possible combinations. The following tables are showing the test modes as the worst cases and recorded in this report.

EUT Configure Mode	Mode Description	Test Condition			
		EMI AC	EMI RE<1G	EMI RE≥1G	EMI RF
1	Operating Mode (GFSK)	Note 1	Note 2	Note 2	Note 3
2	Operating Mode (EDR /4-DQPSK)	Note 1	Note 2	Note 3	Note 3
3	Operating Mode (EDR 8-DPSK)	Note 1	Note 2	Note 3	Note 3
4	Charging Mode (BT Link + WLAN Link + Earphone + Adapter 1 + Battery 1)	✓	✓	Note 2	Note 2
5	Charging Mode (BT Link + WLAN Link + Earphone + Adapter 2 + Battery 2)	✓	✓	Note 2	Note 2

Abbreviations:

EMI AC: AC conducted emissions ; EMI RE<1G: EUT radiated emissions ≥ 1GHz;

EMI RE<1G: EUT radiated emissions < 1GHz ; EMI RF: EUT RF conducted emissions;

Note 1: Fulfill no test criteria, EUT is powered by battery.

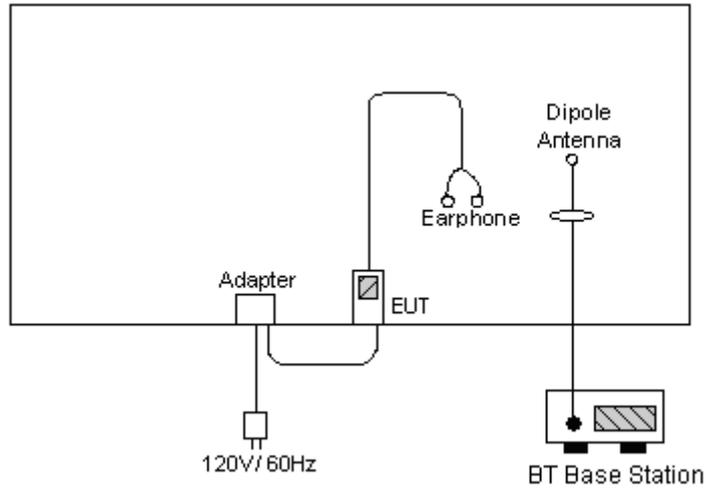
Note 2: Test results are uninfluenced by this EUT configuration mode.

Note 3: Pre-scanned tests exempt in final test result.

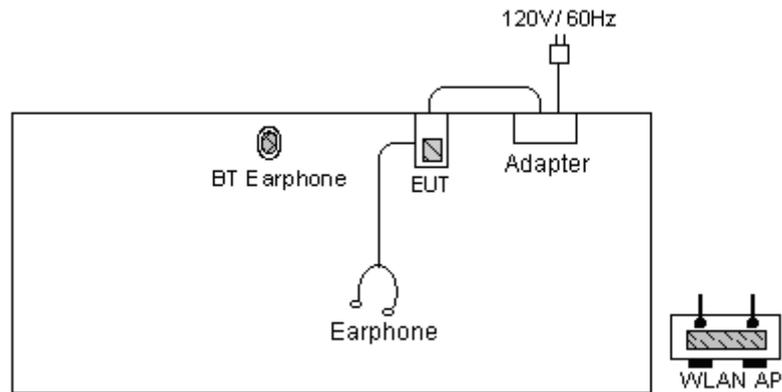
Test Items	EUT Configure Mode	Packet Type	Data Rate (Mbps)	Test Channel
Number of Channels ₁	1	DH5	1	0 - 78
20dB Bandwidth ₂	1	DH5	1	0/39/78
Channel Separation ₁	1	DH5	1	0/39/78
Dwell Time of Each Channel ₁	1	DH5	1	39
Peak Output Power	1	DH5	1	0/39/78
Frequency Band Edges ₂	1	DH5	1	0/78
AC Conducted Emission ₂	4/5	DH5	1	0 - 78
Radiated Emissions < 1GHz	1	DH5	1	39
Radiated Emissions ≥ 1GHz	1	DH5	1	0/39/78

2.4 Connection Diagram of Test System

<Radiated Emission >



< Conducted Emission >



2.5 RF Utility

The programmed RF Utility is installed in EUT to provide channel selection, power level, data rate and the application type. RF Utility can send transmitting signal for all testing. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

3 Test Result

3.1 Number of Channel Measurement

3.1.1 Limits of Number of Hopping Frequency

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

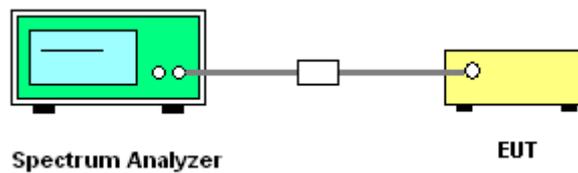
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

1. Please refer FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The modulation types of EUT are irrelevant to number of hopping channels deviation.
4. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
Span = the frequency band of operation; RBW \geq 1% of the span; VBW \geq RBW; Sweep = auto;
Detector function = peak; Trace = max hold.
5. The number of hopping frequency used is defined as the device has the numbers of total channel.

3.1.4 Test Setup



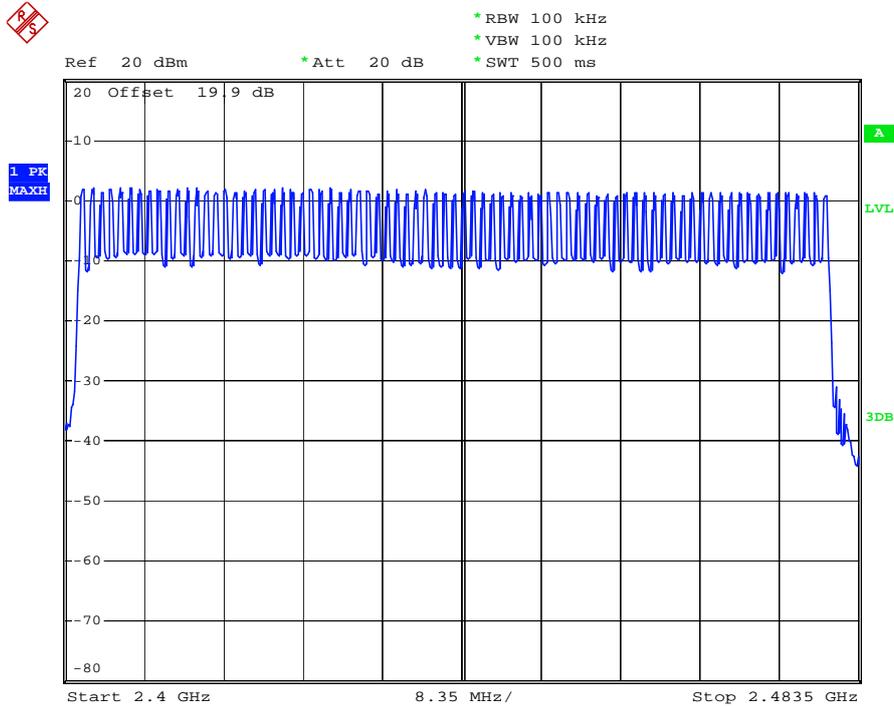
3.1.5 Test Result of Number of Hopping Frequency

EUT Mode :	1	Temperature :	29~30
Test Engineer :	Darren Lin	Relative Humidity :	45~46%

Number of Hopping Channels (Channel)	Limits (Channel)	Pass/Fail
79	> 15	Pass



Number of Hopping Channel Plot on Channel 0 - 78



3.2 20dB Bandwidth Measurement

3.2.1 Limit of 20dB Bandwidth

N/A

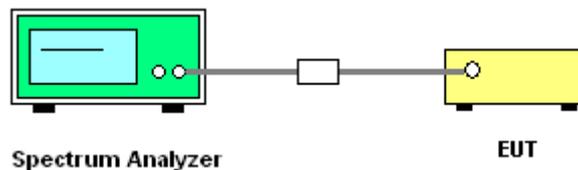
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. Please refer FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. Use the following spectrum analyzer settings:
 Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel;
 RBW \geq 1% of the 20 dB bandwidth; VBW \geq RBW; Sweep = auto; Detector function = peak;
 Trace = max hold.
5. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

3.2.4 Test Setup



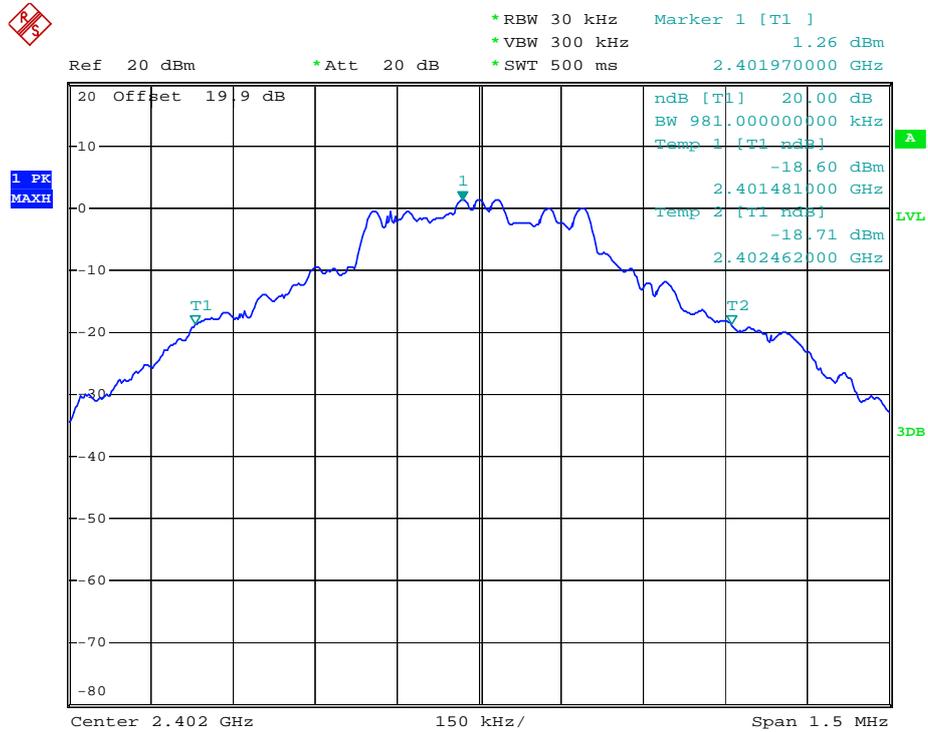
3.2.5 Test Result of 20dB Bandwidth

EUT Mode :	1	Temperature :	29~30
Test Engineer :	Darren Lin	Relative Humidity :	45~46%

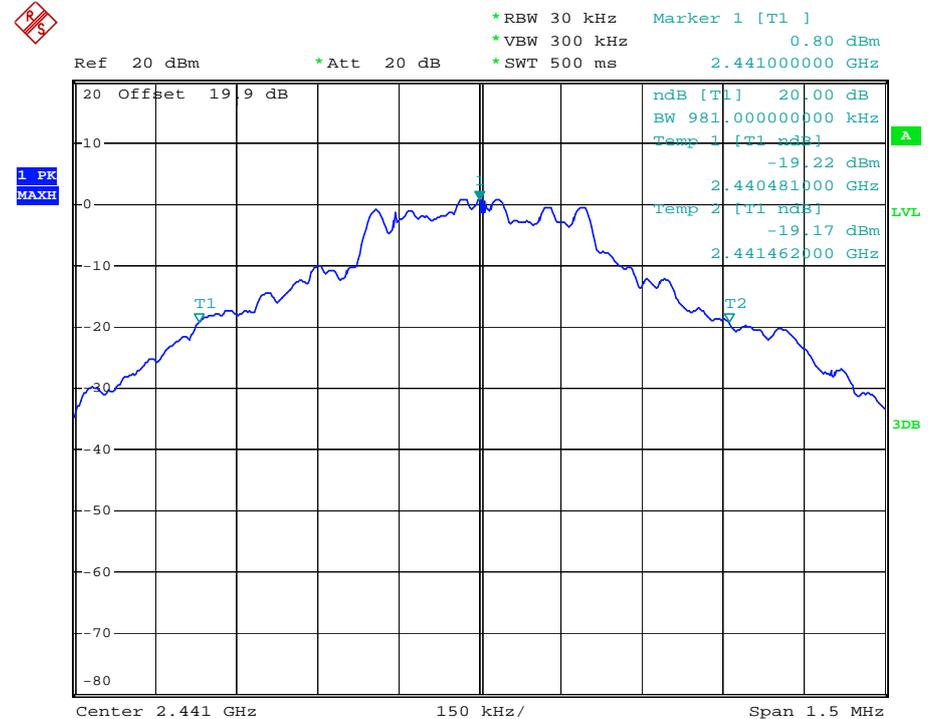
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.981
39	2441	0.981
78	2480	0.978



20 dB Bandwidth Plot on Channel 0

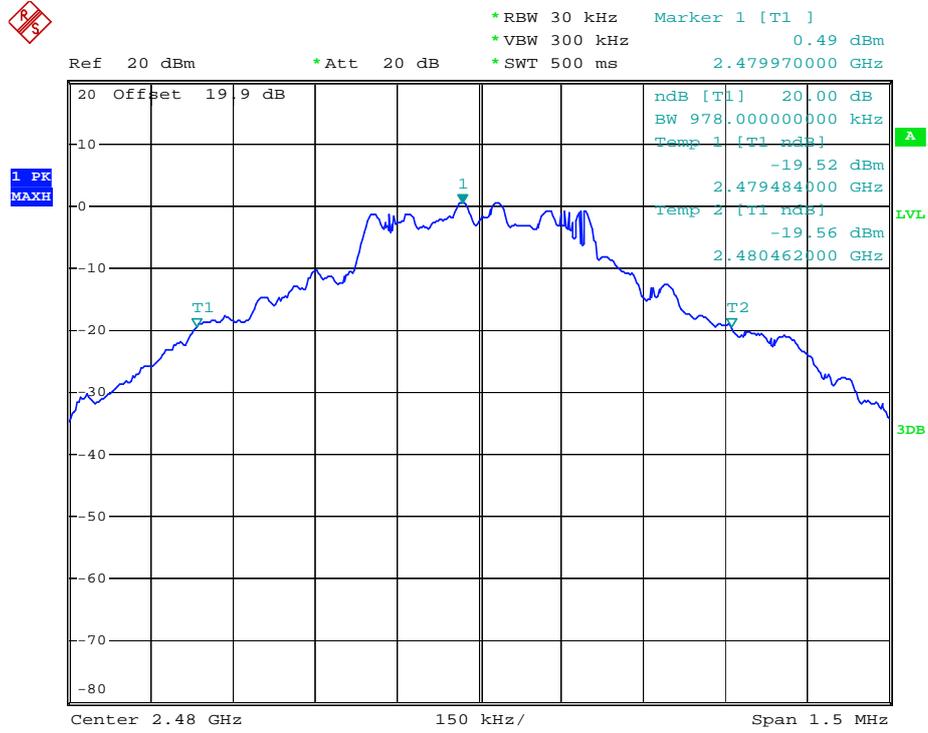


20 dB Bandwidth Plot on Channel 39





20 dB Bandwidth Plot on Channel 78



3.3 Hopping Channel Separation Measurement

3.3.1 Limit of Hopping Channel Separation

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

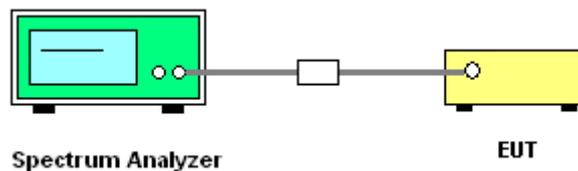
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. Please refer FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. Use the following spectrum analyzer settings:
Span = wide enough to capture the peaks of two adjacent channels; RBW \geq 1% of the span;
VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold.
5. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

3.3.4 Test Setup



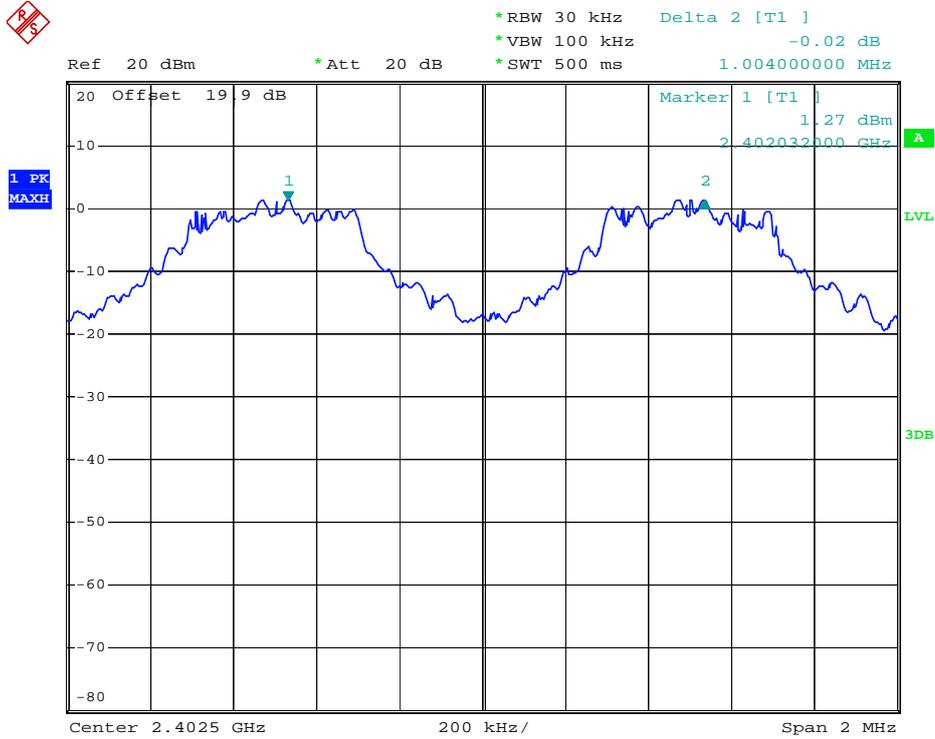
3.3.5 Test Result of Hopping Channel Separation

EUT Mode :	1	Temperature :	29~30
Test Engineer :	Darren Lin	Relative Humidity :	45~46%

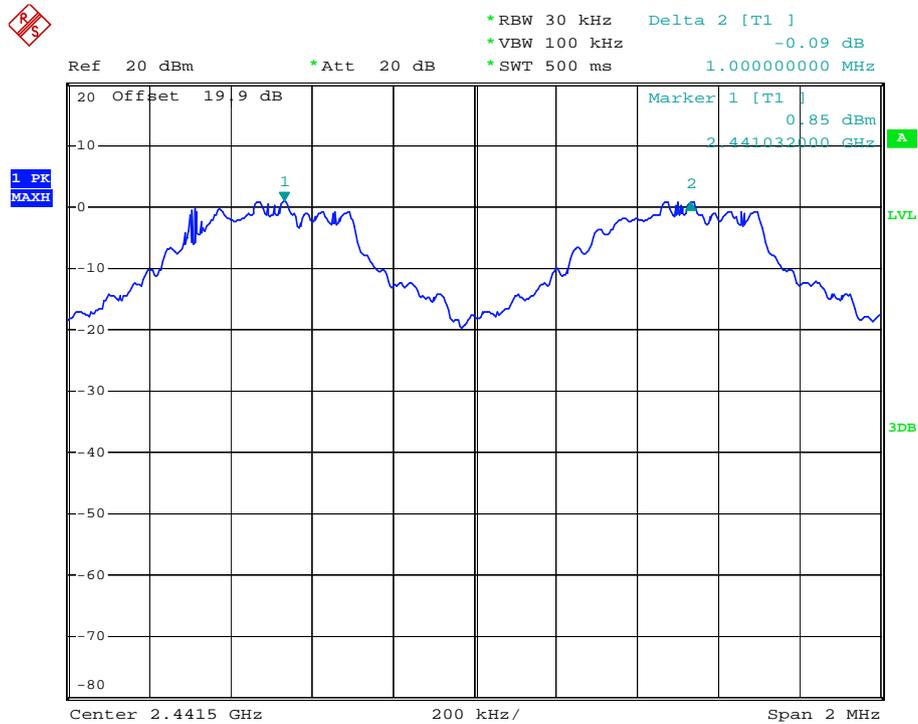
Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.004	0.654	Pass
39	2441	1.000	0.654	Pass
78	2480	1.004	0.652	Pass



Channel Separation Plot on Channel 0 - 1

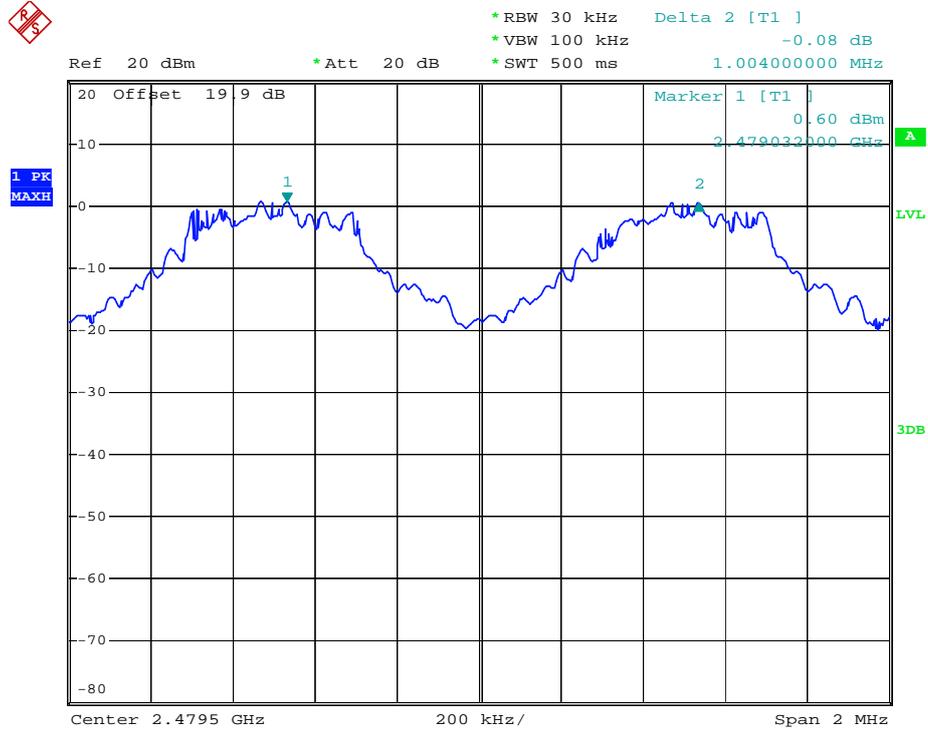


Channel Separation Plot on Channel 39 - 40





Channel Separation Plot on Channel 77 - 78



3.4 Dwell Time of Each Channel Measurement

3.4.1 Limit of Dwell Time of Each Channel

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

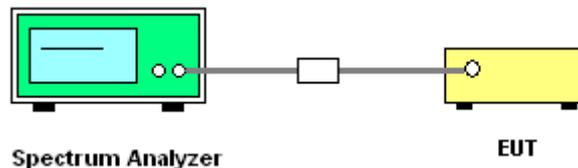
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

1. Please refer FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW ≥ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
5. Use the marker-delta function to determine the dwell time.

3.4.4 Test Setup



3.4.5 Test Result of Dwell Time of Each Channel

EUT Mode :	1	Temperature :	29~30
Test Engineer :	Darren Lin	Relative Humidity :	45~46%

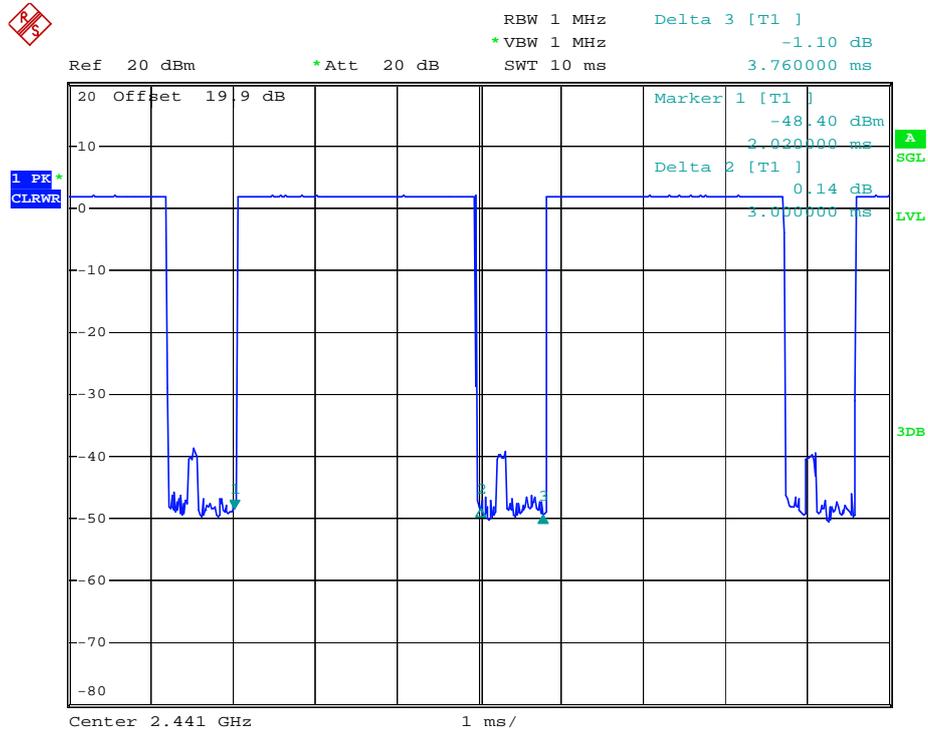
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
DH5	3.10	3000.00	0.29388	0.4	Pass

Remark:

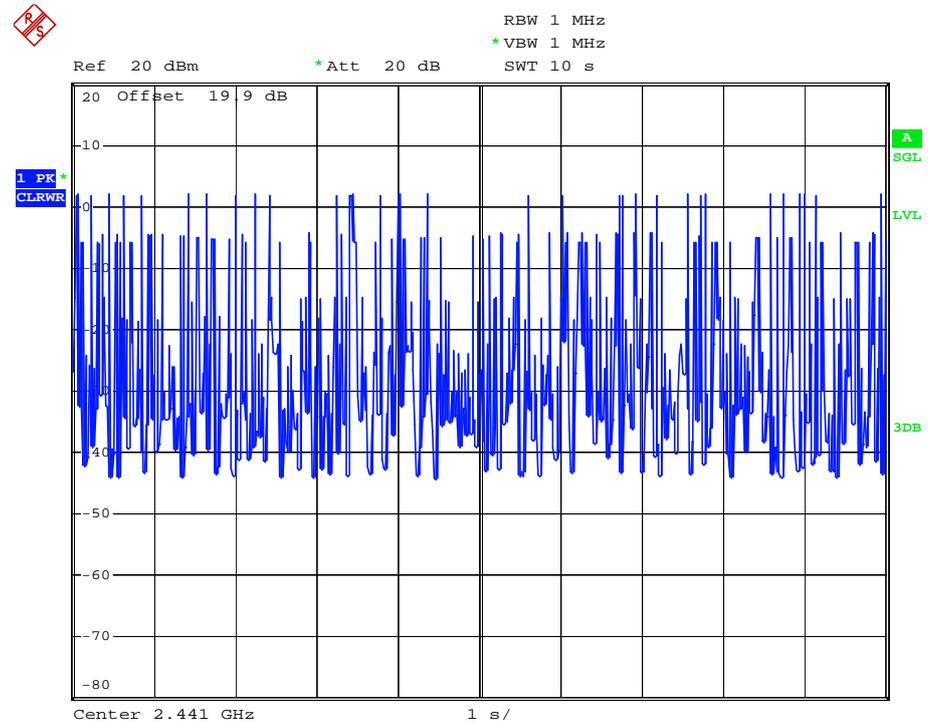
- ◆ Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time
- ◆ 79 channels come from the Hopping Channel number.
- ◆ Average Hopping Channel = hops/sweep time
- ◆ t: Package Transfer Time(us)



DH5 Dwell Time (One Pulse) Plot on Channel 39



DH5 Dwell Time (Count Pulses) Plot on Channel 39



3.5 Peak Output Power Measurement

3.5.1 Limit of Peak Output Power

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW (20.97dBm).

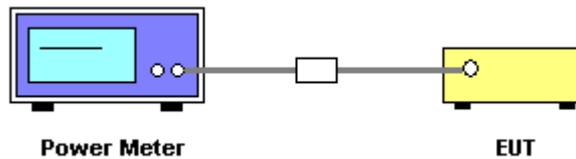
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. Please refer FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the peak power meter by a low loss cable.

3.5.4 Test Setup



3.5.5 Test Result of Peak Output Power

EUT Mode :	1	Temperature :	29~30
Test Engineer :	Darren Lin	Relative Humidity :	45~46%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1Mbps		
00	2402	2.70	30	Pass
39	2441	2.07	30	Pass
78	2480	1.82	30	Pass

3.6 Band Edges Measurement

3.6.1 Limit of Band Edges

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

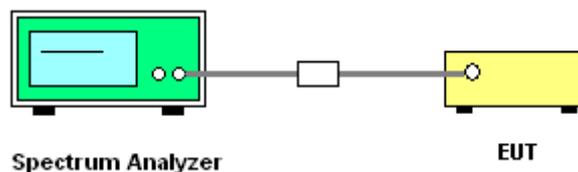
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

1. Please follow the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 100 kHz, Video bandwidth (VBW) > RBW, scan up through 10th harmonic. Bandedge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Applies to bandedge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp (and possibly a high-pass filter) is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation. See FCC Section 15.35(b) and (c).

3.6.4 Test Setup





3.6.5 Test Result of Radiated Band Edges

EUT Mode :	1	Temperature :	29~30
Test Channel :	0	Relative Humidity :	45~46%
Test Engineer :	Darren Lin		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2385.62	58.09	-15.91	74.00	57.99	31.86	3.92	35.68	100	0	Peak
2385.62	36.96	-17.04	54.00	36.86	31.86	3.92	35.68	100	25	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2385.05	49.39	-24.61	74.00	49.29	31.86	3.92	35.68	100	0	Peak
2385.05	33.04	-20.96	54.00	32.96	31.83	3.92	35.68	135	307	Average

EUT Mode :	1	Temperature :	29~30
Test Channel :	78	Relative Humidity :	45~46%
Test Engineer :	Darren Lin		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.50	70.21	-3.79	74.00	69.88	31.98	4.05	35.70	100	0	Peak
2483.50	50.15	-3.85	54.00	49.82	31.98	4.05	35.70	100	6	Average

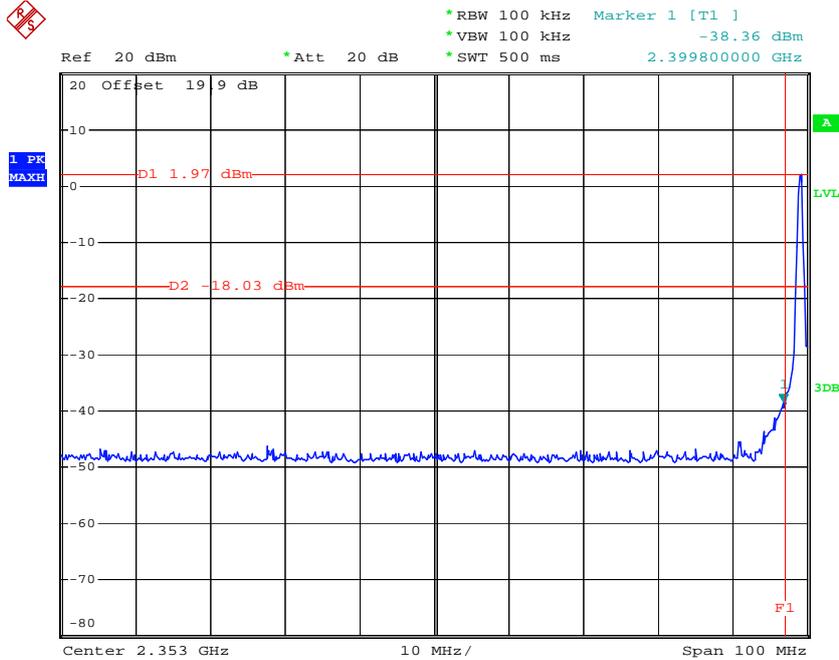
ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.50	67.91	-6.09	74.00	67.58	31.98	4.05	35.70	100	0	Peak
2483.50	47.68	-6.32	54.00	47.35	31.98	4.05	35.70	101	303	Average



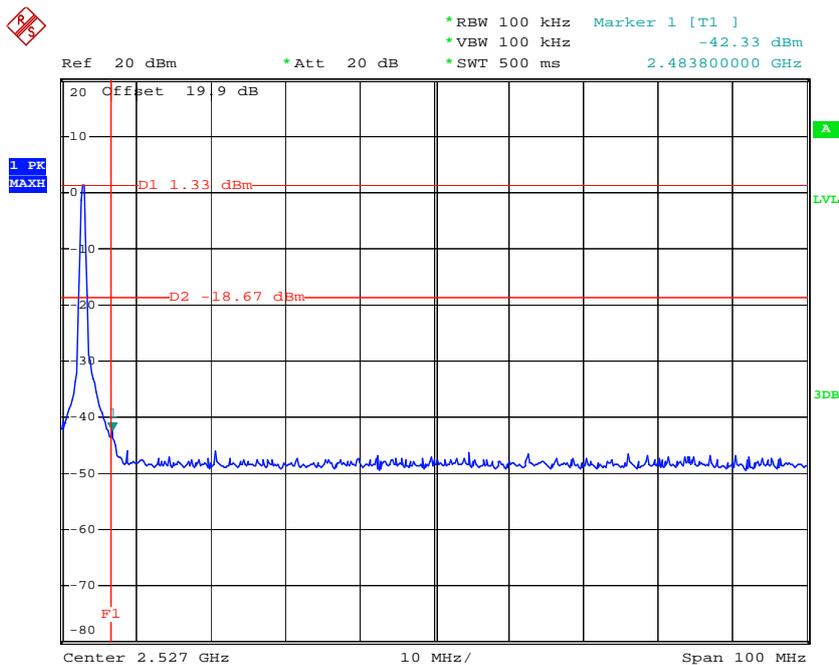
3.6.6 Test Result of Conducted Band Edges

EUT Mode :	1	Temperature :	29~30
Test Engineer :	Darren Lin	Relative Humidity :	45~46%

Low Band Edge Plot on Channel 0



High Band Edge Plot on Channel 78



3.7 AC Conducted Emission Measurement

3.7.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

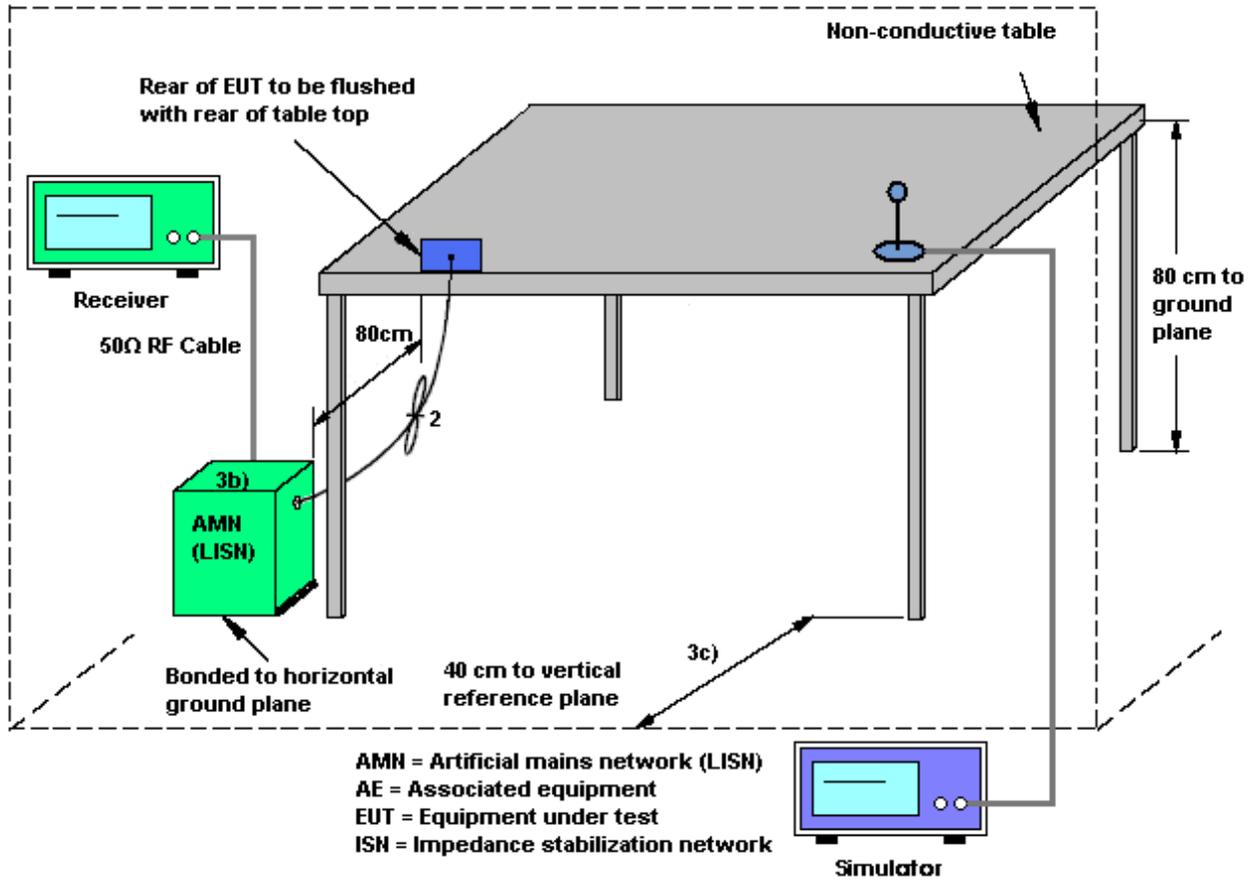
3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

3.7.3 Test Procedures

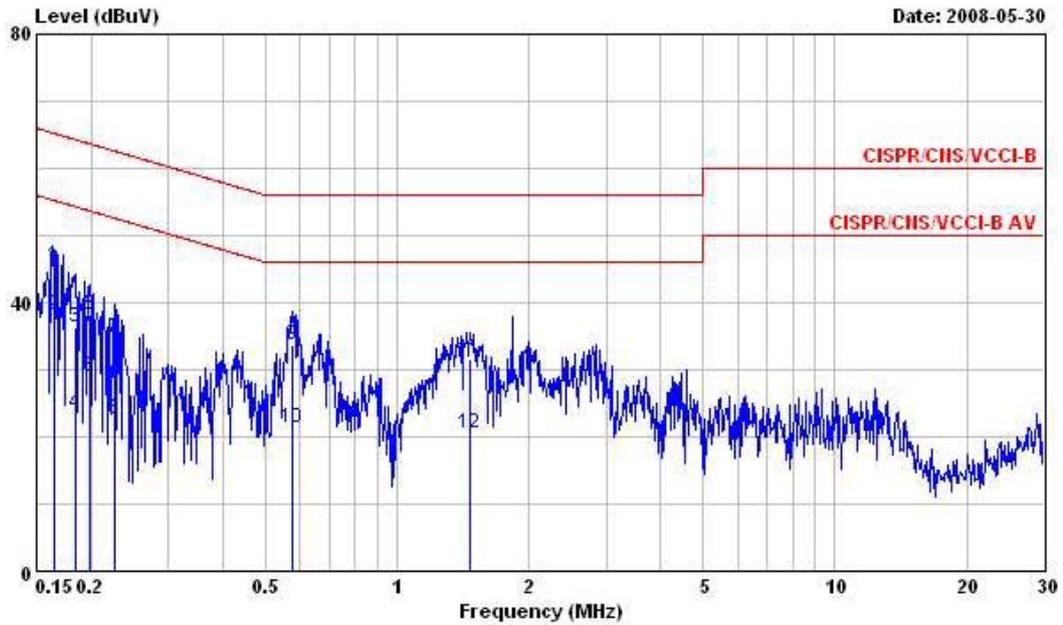
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.7.4 Test Setup



3.7.5 Test Result of AC Conducted Emission

Test Mode :	4	Temperature :	29~30
Test Channel :	0-78	Relative Humidity :	45~46%
Test Engineer :	Darren Lin	Phase :	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

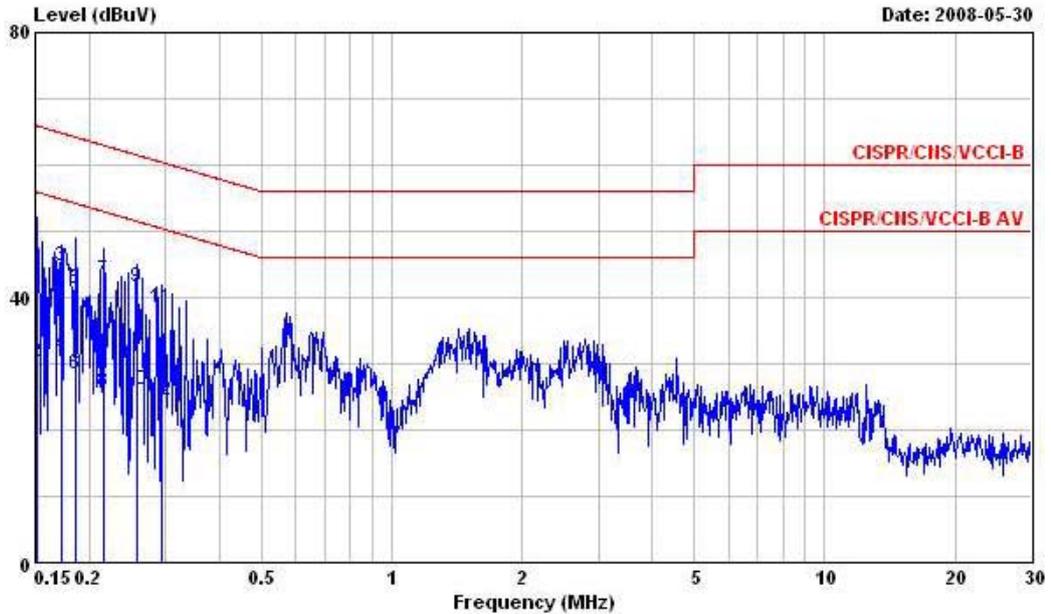


Site : CO04-HY
 Condition : CISPR/CNS/VCCI-B LISN 2008 0416 99041 LINE
 EUT : Mobile Phone
 POWER: 120V/60Hz
 Model : FR852219
 Memo : Model
 IMEI : 359979010017574

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.1641380	45.52	-19.73	65.25	45.29	0.09	0.14	QP
2	0.1641380	38.03	-17.22	55.25	37.80	0.09	0.14	Average
3	0.1834550	36.22	-28.11	64.33	35.99	0.09	0.14	QP
4	0.1834550	23.43	-30.90	54.33	23.20	0.09	0.14	Average
5	0.1986310	38.22	-25.45	63.67	37.99	0.09	0.14	QP
6	0.1986310	29.07	-24.60	53.67	28.84	0.09	0.14	Average
7	0.2267630	34.77	-27.80	62.57	34.43	0.09	0.25	QP
8	0.2267630	22.56	-30.01	52.57	22.22	0.09	0.25	Average
9	0.5761730	33.72	-22.28	56.00	33.01	0.10	0.61	QP
10	0.5761730	21.30	-24.70	46.00	20.59	0.10	0.61	Average
11	1.470	31.52	-24.48	56.00	30.97	0.12	0.43	QP
12	1.470	20.54	-25.46	46.00	19.99	0.12	0.43	Average



Test Mode :	4	Temperature :	29~30
Test Channel :	0-78	Relative Humidity :	45~46%
Test Engineer :	Darren Lin	Phase :	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

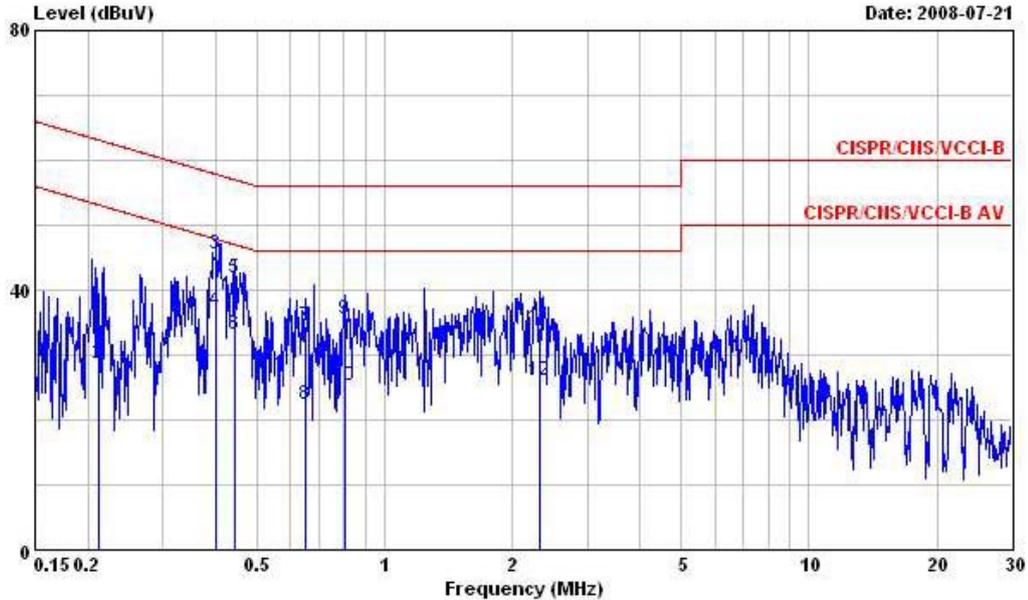


Site : CO04-HY
 Condition : CISPR/CNS/VCCL-B LISN 2008 0416 99041 NEUTRAL
 EUT : Mobile Phone
 POWER: 120V/60Hz
 Model : FR852219
 Memo : Model
 IMEI : 359979010017574

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.1515980	45.76	-20.15	65.91	45.53	0.09	0.14	QP
2	0.1515980	30.30	-25.61	55.91	30.07	0.09	0.14	Average
3	0.1730690	44.61	-20.20	64.81	44.39	0.08	0.14	QP
4	0.1730690	31.30	-23.51	54.81	31.08	0.08	0.14	Average
5	0.1863950	41.40	-22.80	64.20	41.18	0.08	0.14	QP
6	0.1863950	28.37	-25.83	54.20	28.15	0.08	0.14	Average
7	0.2162030	42.52	-20.44	62.96	42.23	0.08	0.21	QP
8	0.2162030	25.73	-27.23	52.96	25.44	0.08	0.21	Average
9	0.2588790	41.49	-19.98	61.47	41.05	0.08	0.36	QP
10	0.2588790	26.18	-25.29	51.47	25.74	0.08	0.36	Average
11	0.2939830	38.35	-22.06	60.41	37.79	0.09	0.47	QP
12	0.2939830	24.54	-25.87	50.41	23.98	0.09	0.47	Average



Test Mode :	5	Temperature :	29~30
Test Channel :	0-78	Relative Humidity :	45~46%
Test Engineer :	Darren Lin	Phase :	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

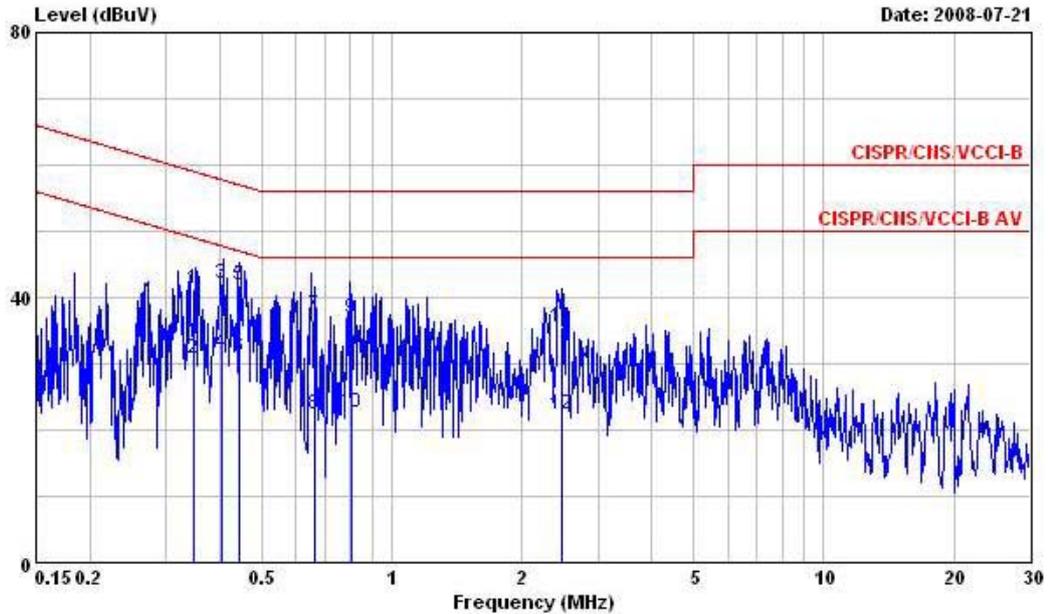


Site : CO04-HY
 Condition : CISPR/CNS/VCCI-B LISN 2008 0416 99041 LINE
 EUT : Mobile Phone
 POWER: 120V/60Hz
 Model : FR852219
 Memo : Mode2
 IMEI : 359979010017574

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.2114060	38.24	-24.91	63.15	37.96	0.09	0.19	QP
2	0.2114060	28.57	-24.58	53.15	28.29	0.09	0.19	Average
3	0.4018680	45.44	-12.37	57.81	44.61	0.10	0.73	QP
4	0.4018680	36.95	-10.86	47.81	36.12	0.10	0.73	Average
5	0.4444290	41.89	-15.09	56.98	41.09	0.10	0.70	QP
6	0.4444290	33.14	-13.84	46.98	32.34	0.10	0.70	Average
7	0.6533940	34.50	-21.50	56.00	33.81	0.11	0.58	QP
8	0.6533940	22.38	-23.62	46.00	21.69	0.11	0.58	Average
9	0.8044850	35.51	-20.49	56.00	34.89	0.11	0.51	QP
10	0.8044850	25.15	-20.85	46.00	24.53	0.11	0.51	Average
11	2.310	34.09	-21.91	56.00	33.54	0.14	0.41	QP
12	2.310	25.95	-20.05	46.00	25.40	0.14	0.41	Average



Test Mode :	5	Temperature :	29~30
Test Channel :	0-78	Relative Humidity :	45~46%
Test Engineer :	Darren Lin	Phase :	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO04-HY
 Condition : CISPR/CNS/VCCI-B LISN 2008 0416 99041 NEUTRAL
 EUT : Mobile Phone
 POWER: 120V/60Hz
 Model : FR852219
 Memo : Mode2
 IMEI : 359979010017574

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.3488820	41.23	-17.76	58.99	40.53	0.09	0.61	QP
2	0.3488820	30.87	-18.12	48.99	30.17	0.09	0.61	Average
3	0.4048790	42.11	-15.64	57.75	41.29	0.09	0.73	QP
4	0.4048790	31.58	-16.17	47.75	30.76	0.09	0.73	Average
5	0.4444290	41.88	-15.10	56.98	41.09	0.09	0.70	QP
6	0.4444290	31.13	-15.85	46.98	30.34	0.09	0.70	Average
7	0.6653440	37.43	-18.57	56.00	36.76	0.10	0.57	QP
8	0.6653440	22.32	-23.68	46.00	21.65	0.10	0.57	Average
9	0.8094840	36.72	-19.28	56.00	36.10	0.11	0.51	QP
10	0.8094840	22.61	-23.39	46.00	21.99	0.11	0.51	Average
11	2.466	35.45	-20.55	56.00	34.92	0.13	0.40	QP
12	2.466	22.38	-23.62	46.00	21.85	0.13	0.40	Average

3.8 Radiated Emission Measurement

3.8.1 Limit of Radiated Emission

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

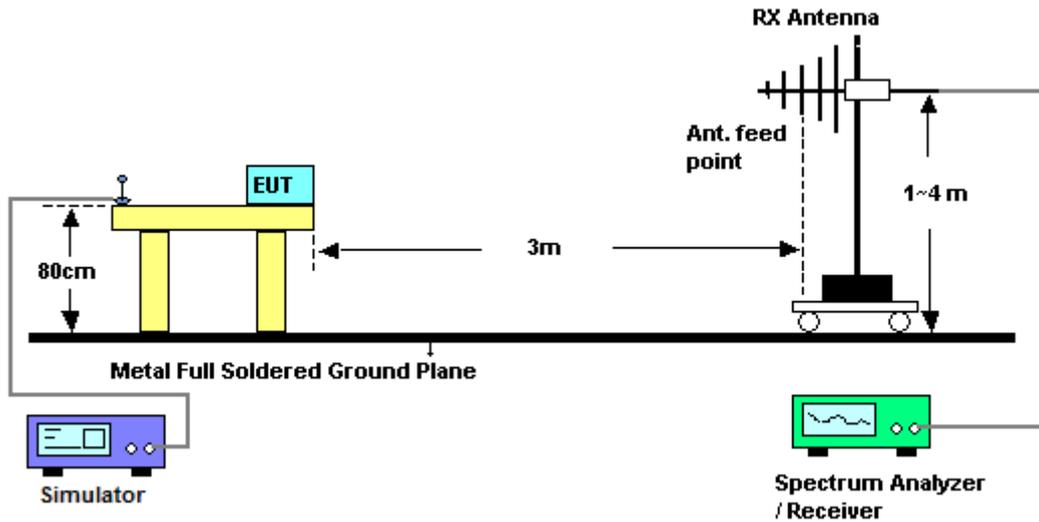
3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

3.8.3 Test Procedures

1. Please follow the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:
Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold.
3. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength.
4. Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in FCC 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from $20\log(\text{dwell time}/100 \text{ ms})$,
5. If the emission on which a radiated measurement must be made is located at the edge of the authorized band of operation, then the alternative “marker-delta” method, listed at the end of this document, may be employed.

3.8.4 Test Setup



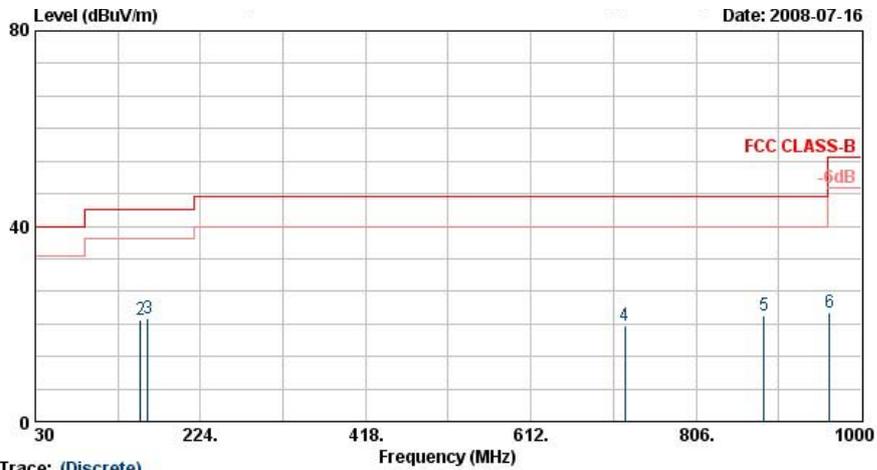
3.8.5 Test Result of Radiated Emission (9kHz - 30MHz)

Test Mode :	1	Temperature :	22~24
Test Channel :	00	Relative Humidity :	50~51%
Test Engineer :	Andrew Hsiao	Polarization :	Horizontal
Remark :	All amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported		



3.8.6 Test Result of Radiated Emission < 1GHz

Test Mode :	1	Temperature :	22~24
Test Channel :	39	Relative Humidity :	50~51%
Test Engineer :	Andrew Hsiao	Polarization :	Horizontal
Remark :			

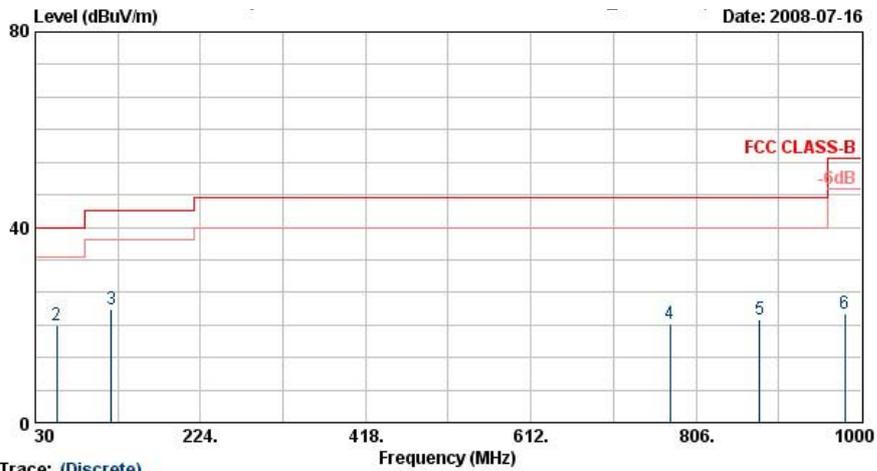


Trace: (Discrete)
 Site : 03CH06-HY
 Condition : FCC CLASS-B 3m LF-ANT(951121) HORIZONTAL
 EUT : Mobile Phone
 Power : 120Vac/60Hz
 Model : FR 852219
 Memo : Mode 1
 Data Rate : DH5
 Plane : E2
 TIME : 359979010012641

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB	dB	cm	deg	
1	30.00	18.25	-21.75	40.00	29.85	19.66	0.30	31.56	108	Peak
2	153.39	20.84	-22.66	43.50	41.67	10.32	0.60	31.76	---	Peak
3	162.03	21.09	-22.41	43.50	42.32	10.09	0.60	31.92	---	Peak
4	722.80	19.49	-26.51	46.00	31.51	19.10	1.17	32.29	---	Peak
5	885.90	21.61	-24.39	46.00	31.77	20.43	1.30	31.88	---	Peak
6	962.90	22.26	-31.74	54.00	31.22	20.98	1.30	31.24	---	Peak



Test Mode :	1	Temperature :	22~24
Test Channel :	39	Relative Humidity :	50~51%
Test Engineer :	Andrew Hsiao	Polarization :	Vertical
Remark :			



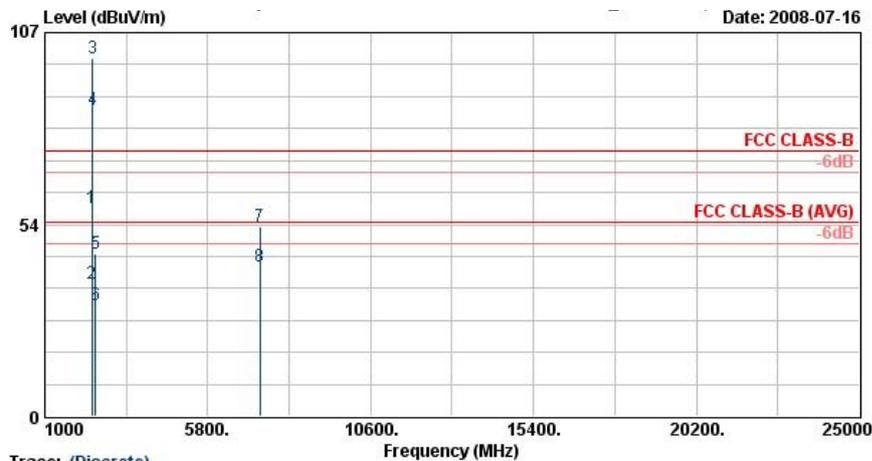
Trace: (Discrete)
 Site : 03CH06-HY
 Condition : FCC CLASS-B 3m LF-ANT(951121) VERTICAL
 EUT : Mobile Phone
 Power : 120Vac/60Hz
 Model : FR 852219
 Memo : Mode 1
 Data Rate : DH5
 Plane : E2
 IMET : 359979010012641

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.54	21.47	-18.53	40.00	33.83	18.95	0.30	31.61	100	236	Peak
2	54.84	20.03	-19.97	40.00	44.18	7.35	0.40	31.90	---	---	Peak
3	119.64	23.15	-20.35	43.50	41.88	12.50	0.50	31.74	---	---	Peak
4	775.30	20.09	-25.91	46.00	31.47	19.59	1.15	32.12	---	---	Peak
5	880.30	21.17	-24.83	46.00	31.43	20.39	1.30	31.95	---	---	Peak
6	980.40	22.30	-31.70	54.00	30.90	21.10	1.30	31.01	---	---	Peak



3.8.7 Test Result of Radiated Emission ≥ 1 GHz

Test Mode :	1	Temperature :	22~24
Test Channel :	00	Relative Humidity :	50~51%
Test Engineer :	Andrew Hsiao	Polarization :	Horizontal
Remark :	#3 and #4 are Fundamental Signals		

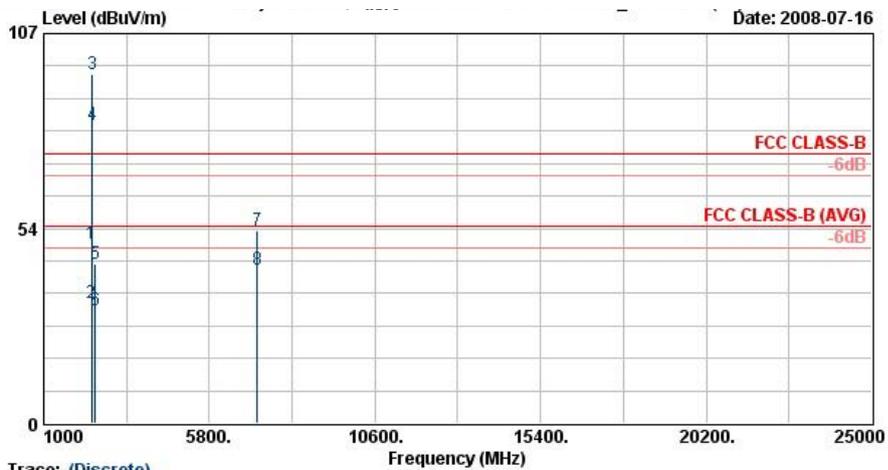


Trace: (Discrete)
 Site : 03CH06-HY
 Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL
 EUT : Mobile Phone
 Power : 120Vac/60Hz
 Model : FR 852219
 Memo : Mode 1
 Data Rate : DH5
 Plane : E2
 IMEI : 359979010012641

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2385.62	58.09	-15.91	74.00	57.99	31.86	3.92	35.68	100	0	Peak
2	2385.62	36.96	-17.04	54.00	36.86	31.86	3.92	35.68	100	25	Average
3 X	2402.00	99.93			99.81	31.88	3.92	35.68	100	0	Peak
4 @	2402.00	85.65			85.55	31.86	3.92	35.68	100	25	Average
5	2494.00	45.35	-28.65	74.00	45.00	32.00	4.05	35.70	100	0	Peak
6	2494.00	31.16	-22.84	54.00	30.81	32.00	4.05	35.70	100	25	Average
7	7347.00	52.98	-21.02	74.00	46.25	35.66	7.21	36.14	100	0	Peak
8	7347.00	41.85	-12.15	54.00	35.12	35.66	7.21	36.14	100	132	Average



Test Mode :	1	Temperature :	22~24
Test Channel :	00	Relative Humidity :	50~51%
Test Engineer :	Andrew Hsiao	Polarization :	Vertical
Remark :	#3 and #4 are Fundamental Signals		

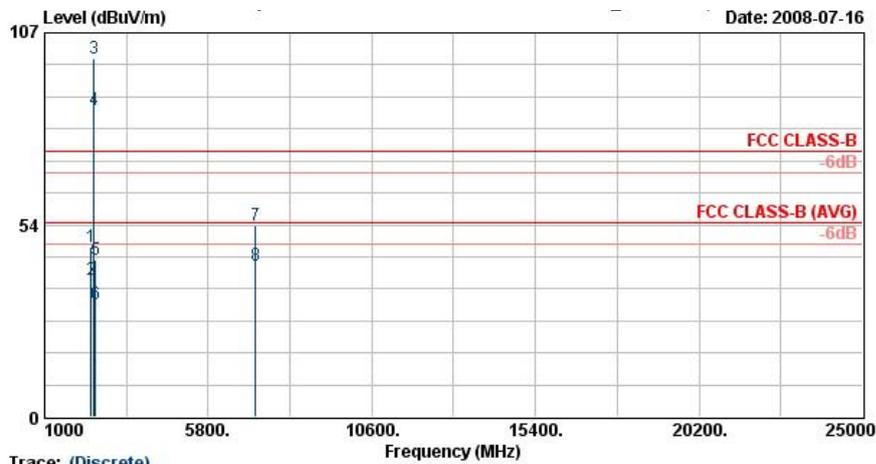


Trace: (Discrete)
 Site : 03CH06-HY
 Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL
 EUT : Mobile Phone
 Power : 120Vac/60Hz
 Model : FR 852219
 Memo : Mode 1
 Data Rate : DHS
 Plane : E2
 TMET : 350079010012641

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Remark
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2385.05	49.39	-24.61	74.00	49.29	31.86	3.92	35.68	100	0	Peak
2	2385.05	33.04	-20.96	54.00	32.96	31.83	3.92	35.68	135	307	Average
3 X	2402.00	95.73			95.61	31.88	3.92	35.68	100	0	Peak
4 @	2402.00	82.11			82.01	31.86	3.92	35.68	135	307	Average
5	2484.00	43.65	-30.35	74.00	43.32	31.98	4.05	35.70	100	0	Peak
6	2484.00	31.02	-22.98	54.00	30.69	31.98	4.05	35.70	135	307	Average
7	7182.00	52.85	-21.15	74.00	46.04	35.72	7.16	36.07	100	0	Peak
8	7182.00	42.07	-11.93	54.00	35.26	35.72	7.16	36.07	100	219	Average



Test Mode :	1	Temperature :	22~24
Test Channel :	39	Relative Humidity :	50~51%
Test Engineer :	Andrew Hsiao	Polarization :	Horizontal
Remark :	#3 and #4 are Fundamental Signals		

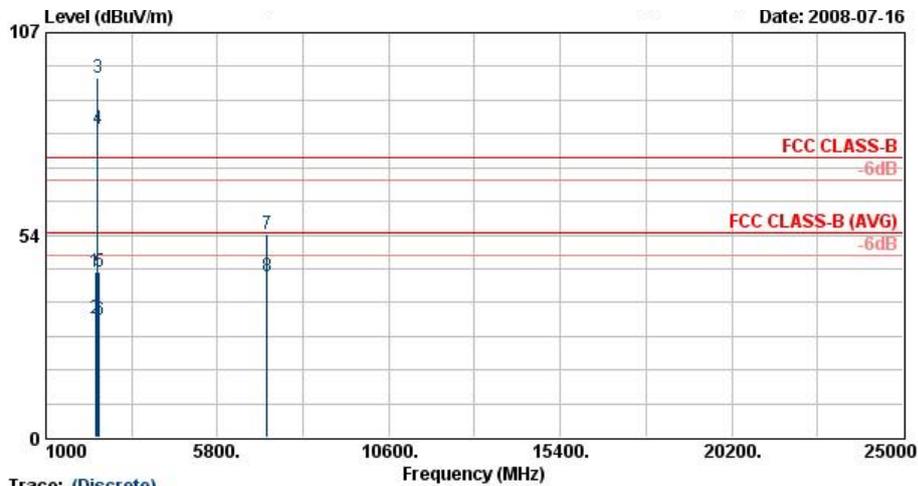


Trace: (Discrete)
 Site : 03CH06-HY
 Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL
 EUT : Mobile Phone
 Power : 120Vac/60Hz
 Model : FR 852219
 Memo : Mode 2
 Data Rate : DH5
 Plane : E2
 TWT : 359979010012641

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2372.00	47.29	-26.71	74.00	47.24	31.83	3.89	35.68	100	0	Peak
2	2372.00	38.05	-15.95	54.00	38.01	31.83	3.89	35.68	101	26	Average
3 X	2441.00	100.02			99.79	31.93	3.99	35.69	100	0	Peak
4 @	2441.00	85.40			85.18	31.93	3.99	35.69	101	26	Average
5	2486.00	43.78	-30.22	74.00	43.45	31.98	4.05	35.70	100	0	Peak
6	2486.00	31.25	-22.75	54.00	30.92	31.98	4.05	35.70	101	26	Average
7	7182.00	53.30	-20.70	74.00	46.49	35.72	7.16	36.07	100	0	Peak
8	7182.00	42.13	-11.87	54.00	35.32	35.72	7.16	36.07	100	207	Average



Test Mode :	1	Temperature :	22~24
Test Channel :	39	Relative Humidity :	50~51%
Test Engineer :	Andrew Hsiao	Polarization :	Vertical
Remark :	#3 and #4 are Fundamental Signals		



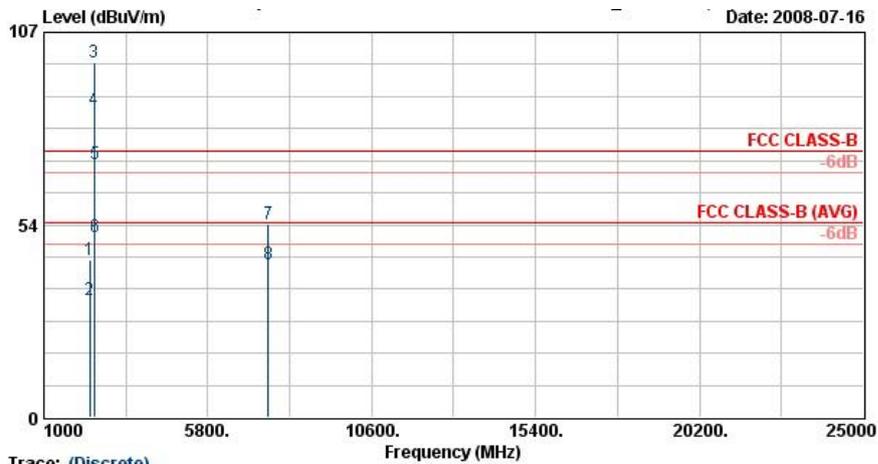
Trace: (Discrete)

Site : 03CH06-HY
 Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL
 EUT : Mobile Phone
 Power : 120Vac/60Hz
 Model : FR 652219
 Memo : Mode 2
 Data Rate : DH5
 Plane : E2
 TIME : 359979010012641

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2390.00	43.85	-30.15	74.00	43.75	31.86	3.92	35.68	100	0	Peak
2	2390.00	31.54	-22.46	54.00	31.44	31.86	3.92	35.68	101	305	Average
3 X	2441.00	95.10			94.88	31.93	3.99	35.69	100	0	Peak
4 @	2441.00	81.47			81.25	31.93	3.99	35.69	101	305	Average
5	2486.00	43.91	-30.09	74.00	43.58	31.98	4.05	35.70	100	0	Peak
6	2486.00	31.04	-22.96	54.00	30.71	31.98	4.05	35.70	101	305	Average
7	7182.00	53.55	-20.45	74.00	46.74	35.72	7.16	36.07	100	0	Peak
8	7182.00	42.42	-11.58	54.00	35.61	35.72	7.16	36.07	100	307	Average



Test Mode :	1	Temperature :	22~24
Test Channel :	78	Relative Humidity :	50~51%
Test Engineer :	Andrew Hsiao	Polarization :	Horizontal
Remark :	#3 and #4 are Fundamental Signals		

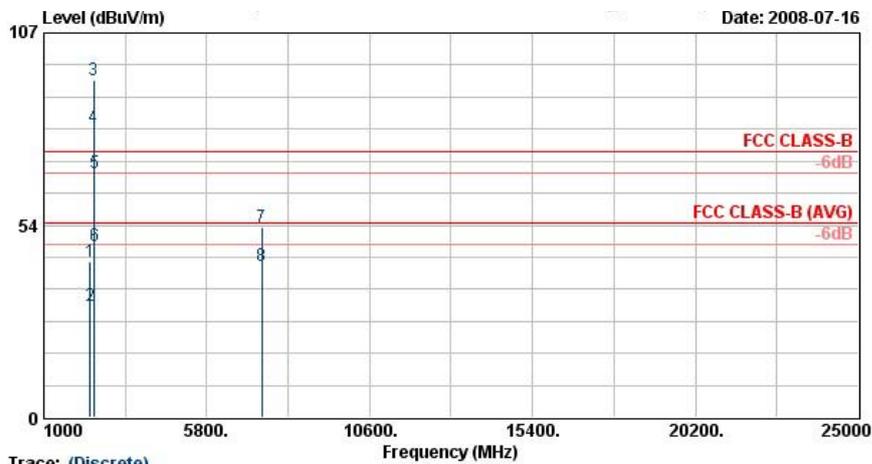


Trace: (Discrete)
 Site : 03CH06-HY
 Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL
 EUT : Mobile Phone
 Power : 120Vac/60Hz
 Model : FR 852219
 Memo : Mode 3
 Data Rate : DH5
 Plane : E2
 TMET : 359979010012641

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2334.00	43.89	-30.11	74.00	43.94	31.76	3.86	35.67	100	0	Peak
2	2334.00	32.58	-21.42	54.00	32.63	31.76	3.86	35.67	100	6	Average
3 X	2480.00	98.55			98.22	31.98	4.05	35.70	100	0	Peak
4 @	2480.00	85.36			85.03	31.98	4.05	35.70	100	6	Average
5 !	2483.50	70.21	-3.79	74.00	69.88	31.98	4.05	35.70	100	0	Peak
6 !	2483.50	50.15	-3.85	54.00	49.82	31.98	4.05	35.70	100	6	Average
7	7566.00	53.57	-20.43	74.00	46.86	35.61	7.31	36.21	100	0	Peak
8	7566.00	42.43	-11.57	54.00	35.72	35.61	7.31	36.21	100	223	Average



Test Mode :	1	Temperature :	22~24
Test Channel :	78	Relative Humidity :	50~51%
Test Engineer :	Andrew Hsiao	Polarization :	Vertical
Remark :	#3 and #4 are Fundamental Signals		



Site : 03CH06-HY
 Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL
 EUT : Mobile Phone
 Power : 120Vac/60Hz
 Model : FR 852219
 Memo : Mode 3
 Data Rate : DH5
 Plane : E2
 TMET : 359979010012641

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2356.00	43.50	-30.50	74.00	43.51	31.81	3.86	35.67	100	0	Peak
2	2356.00	31.10	-22.90	54.00	31.11	31.81	3.86	35.67	101	303	Average
3 X	2480.00	93.71			93.38	31.98	4.05	35.70	100	0	Peak
4 @	2480.00	80.59			80.26	31.98	4.05	35.70	101	303	Average
5	2483.50	67.91	-6.09	74.00	67.58	31.98	4.05	35.70	100	0	Peak
6	2483.50	47.68	-6.32	54.00	47.35	31.98	4.05	35.70	101	303	Average
7	7422.00	53.03	-20.97	74.00	46.33	35.63	7.24	36.17	100	0	Peak
8	7422.00	42.12	-11.88	54.00	35.42	35.63	7.24	36.17	100	291	Average



3.9 Antenna Requirements

3.9.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no other antenna except assembled by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi

3.9.2 Antenna Connected Construction

The antennas type used in this product is PIFA antenna without connector and it is considered to meet antenna requirement of FCC

3.9.3 Antenna Gain

The antenna gain of EUT is 2 dBi, which is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
EMC Receiver	R&S	ESCS 30	100359	9kHz – 2.75GHz	Mar. 03, 2008	Mar. 02, 2009	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99079	9kHz – 30MHz	Mar. 31, 2008	Mar. 29, 2009	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz – 30MHz	Mar. 22, 2008	Mar. 21, 2009	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2008	Apr. 19, 2009	Conduction (CO04-HY)
ISN	SCHAFFNER	ISN T400	21653	9kHz –30MHz	Mar. 27, 2008	Mar. 26, 2009	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	N/A	Conduction (CO04-HY)
Spectrum Analyzer	Agilent	E4408B	MY44211028	9KHz-26.5GHz	Oct. 17, 2007	Oct. 16, 2008	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESCS30	100356	9KHz-2.75GHz	Jul. 26, 2007	Jul. 25, 2008	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Dec. 01, 2007	Nov. 30, 2008	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00075962	1G~18G	Aug. 29, 2007	Aug. 28, 2008	Radiation (03CH06-HY)
SHF-EHF Horn	SCHWARZBECK	BBHA 9170	9170-251	14G - 40G	Oct. 17, 2007	Oct. 16, 2008	Radiation (03CH06-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1G - 26.5G	Nov. 22, 2007	Nov. 21, 2008	Radiation (03CH06-HY)
Pre Amplifier	EMEC	PA303	PA303-SMA-059	100K~3GHz	Nov. 26, 2007	Nov. 25, 2008	Radiation (03CH06-HY)
Base Station Simulator	R & S	CMU200	103937	Third-Band	Oct. 19, 2007	Oct. 18, 2008	Radiation (03CH06-HY)

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.10	Normal(k=2)	0.05
Cable loss	0.10	Normal(k=2)	0.05
AMN insertion loss	2.50	Rectangular	0.63
Receiver Spec	1.50	Rectangular	0.43
Site imperfection	1.39	Rectangular	0.80
Mismatch	+0.34/-0.35	U-shape	0.24
Combined standard uncertainty Uc(y)	1.13		
Measuring uncertainty for a level of Confidence of 95% U=2Uc(y)	2.26		

Uncertainty of Radiated Emission Measurement (30MHz ~ 1000MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.41	Normal(k=2)	0.21
Antenna factor calibration	0.83	Normal(k=2)	0.42
Cable loss calibration	0.25	Normal(k=2)	0.13
Pre Amplifier Gain calibration	0.27	Normal(k=2)	0.14
RCV/SPA specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site imperfection	1.43	Rectangular	0.83
Mismatch	+0.39/-0.41	U-shaped	0.28
Combined standard uncertainty Uc(y)	1.27		
Measuring uncertainty for a level of Confidence of 95% U=2Uc(y)	2.54		



Uncertainty of Radiated Emission Measurement (1GHz ~ 40GHz)

Contribution	Uncertainty of x_i		$u(x_i)$	C_i	$C_i * u(x_i)$
	dB	Probability Distribution			
Receiver reading	±0.10	Normal(k=1)	0.10	1	0.10
Antenna factor calibration	±1.70	Normal(k=2)	0.85	1	0.85
Cable loss calibration	±0.50	Normal(k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20 \log(1 - \Gamma_1 * \Gamma_2 * \Gamma_3)$	+0.34/-0.35	U-shaped	0.244	1	0.244
Combined standard uncertainty $U_c(y)$	2.36				
Measuring uncertainty for a level of Confidence of 95% $U = 2U_c(y)$	4.72				

6 Certification of TAF Accreditation



Certificate No. : L1190-070110

財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

This is to certify that

Sporton International Inc.
EMC & Wireless Communications Laboratory
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien,
Taiwan, R.O.C.

is accredited in respect of laboratory

Accreditation Criteria	: ISO/IEC 17025:2005
Accreditation Number	: 1190
Originally Accredited	: December 15, 2003
Effective Period	: January 10, 2007 to January 09, 2010
Accredited Scope	: Testing Field, see described in the Appendix
Specific Accreditation Program	: Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory

Jay-San Chen

Jay-San Chen
President, Taiwan Accreditation Foundation
Date : January 10, 2007

PI, total 9 pages

The Appendix forms an integral part of this Certificate, which shall be invalid when used without the Appendix.



Appendix A. Photographs of EUT

Please refer to Sporton report number EP852219-02 as below.